**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Robert J. Koffron, et al.

Group Art Unit: 1742

Examiner: Scott R. Kastler

Serial No.: 10/781,272

Filed: February 18, 2004

For: **VORTEX INHIBITOR WITH SACRIFICIAL ROD**

Attorney Docket No.: KOFF 0124 PUS1

# AMENDED APPEAL BRIEF UNDER 37 C.F.R. § 41.37

**Mail Stop Appeal Brief - Patents**
Commissioner for Patents
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief was previously filed on September 6, 2005. This Appeal Brief is currently amended in response to the Notification of Non-Compliant Appeal Brief mailed on October 31, 2006.

In the Notification of Non-Compliant Appeal Brief, the Examiner states:

> As stated in the remand from the Board of Patent Appeals on 9/27/2006, an amended brief must be supplied to comply with the requirements of 37 CFR § 41.37(c)(1)(v)(2004) which requires that Appellant identify every means plus function and step plus function as permitted by 35 USC 112 sixth paragraph. (See pages 3 and 4 of the remand.)

**CERTIFICATE OF ELECTRONIC FILING**

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The Remand from the Board of Patent Appeals on September 27, 2006 further states:

> According to 37 CFR § 41.37(c)(1)(v)(2004), the Appellants are required to identify "every means plus function and step plus function as permitted by 35 USC [§] 112, sixth paragraph," and set forth "the structure, material, or acts described in the specification as corresponding to each claimed function . . . with reference to the specification by page and line number, and to the drawing, if any, by reference characters" in the Summary of Claimed Subject Matter section of their Brief. However, the Appellants have not done so.
>
> 37 CFR § 41.37(d)(2004) states that:
>
> > If a brief is filed which does not comply with all the requirements of paragraph (c) of this section, appellant will be notified of the reasons for non-compliance and given a time period within which to file an amended brief. If appellant does not file an amended brief within the set time period, or files an amended brief which does not overcome all the reasons for non-compliance stated in the notification, the appeal will stand dismissed.
>
> Thus, upon return of this application, the Examiner must require the Appellants to submit an amended Brief to comply with the requirements of 37 CFR § 41.37(c) (1)(v)(2004). Upon receiving the amended Brief, the Examiner must review it to determine (1) whether it meets the requirements set forth in 37 CFR § 41.37(c)(1)(2004) and (2) whether the structures disclosed in the specification are clearly defined and linked to the claimed means-plus-function limitation in compliance with 35 USC § 112, second paragraph. (Footnote omitted.)

Without acquiescence to the basis for the Examiner's notification, Applicants have amended the Summary of Claimed Subject Matter to comply with the instructions of the Notification.

## I. REAL PARTY IN INTEREST

The real party in interest is Tetron, Inc., a corporation organized and existing by virtue of the laws of the State of Michigan, and having a place of business at Farmington Hills, County of Oakland, and State of Michigan, as set forth in the assignment recorded in the United States Patent and Trademark Office on January 16, 2001 at Reel 011479, Frame 0584.

## II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to the Appellant, the Appellant's legal representative, or the Assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

## III. STATUS OF CLAIMS

Claims 1-12, 14-25 and 28-31 are pending in this application. Claims 1-12, 14-25 and 28-31 stand rejected and are the subject of this appeal.

## IV. STATUS OF AMENDMENTS

All proposed amendments have been entered.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

Three independent claims are subject to this appeal, claims 1, 14, and 30.

Claim 1 is drawn to a vortex inhibitor for molten metal pouring from a discharge nozzle. (p. 4, ll. 2-4.) The vortex inhibitor includes a uniform castable refractory body having a generally tapering shape along a longitudinal axis from a base toward a narrow end and a hollow chamber positioned longitudinally to the body extending within the body. (p. 4, ll. 26-27.) The vortex inhibitor also includes a means for orienting the refractory body in a narrow end downward position if the refractory body is misaligned. The means for orienting is retained by the hollow chamber. (p. 8, ll. 17-18.) The integral body, *i.e.* the

combination of the refractory body and the means for orienting, has a specific gravity of less than the specific gravity of molten metal. (p. 6, ll. 1-3.)

Claim 1 includes a means-plus-function limitation as permitted by 35 U.S.C. § 112, paragraph 6.[1] Claim 1 recites "a means for orienting the refractory body in a narrow end downward position if the refractory body is misaligned, wherein the means for aligning is retained by the hollow chamber." A sacrificial member is the structure clearly defined and linked to the claimed means-plus-function limitation recited in claim 1 in compliance with 35 U.S.C. § 112, second paragraph. Applicants reference the specification at p. 4, ll. 4-13 (emphasis added):

> The vortex inhibitor has a specific gravity less than the specific gravity of molten metal and is self-orienting in a narrow end downward position in a molten metal bath. The sacrificial member does not inhibit the flow of the molten metal since it can dissipate shortly after introduction into the metal bath. Additionally, even <u>if the sacrificial rod strikes the wall of the receptacle, the rod can dissipate shortly after introduction into the receptacle,</u> thus freeing the body to relocate to the area in which the vortex forms. Furthermore, the sacrificial member may be constructed of inexpensive metal rod, bar, pole, or other

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[1] In the Office Action dated February 14, 2005, the Examiner stated as follows:

> In the response filed on 12-29-2004, applicant has properly asserted means-plus-function interpretation of the terms "means for orienting the refractory body" and "means for orienting the refractory body" appearing in independent claims 1, 14 and 30, and defined in the specification, as pointed out by the applicant, at pages 5 and 9 as the "sacrificial elongated member" constructed of hollow or solid metal and which can be coated with refractory material.

Therefore, the Examiner agrees that the Applicants have properly recited means-plus-function limitations in claims 1, 14 and 30 complying with 35 U.S.C. § 112, second and sixth paragraphs.

> types of elongated members such as tubes, rather than the intricate and expensive guide systems of the prior art.

The rod (member) striking the wall of the receptacle is an example of "if the refractory body is misaligned" and the sacrificial rod dissipating is an example of "orienting the refractory body in a narrow and downward position."

The figures depict examples of sacrificial member structures. Figures 2 and 3 depict sacrificial member 32. Figure 4 depicts sacrificial member 38. Figure 5 depicts sacrificial member 58. Figure 6 depicts sacrificial member 74. Figure 7 depicts sacrificial member 97.

Claim 14 is drawn to a vortex inhibitor for molten metal pouring from a discharge nozzle. (p. 4, ll. 2-4.) The vortex inhibitor includes a uniform castable refractory body having a generally tapering shape along a longitudinal axis from a base toward a narrow end and a hollow chamber positioned longitudinally to the body extending within the body. (p. 4, ll. 26-27.) The vortex inhibitor also includes a means for aligning the refractory body in the metal pouring vessel during at least a portion of the metal pour without substantially obstructing the flow of molten metal through the discharge nozzle. The means for aligning is retained by the hollow chamber. (p. 8, ll. 17-18.) The integral body, *i.e.* the combination of the refractory body and the means for aligning, has a specific gravity less than the specific gravity of molten metal, and is self-orienting in a narrow end downward position when supported in molten metal. (p. 6, ll. 1-3.)

Claim 14 includes a means-plus-function limitation as permitted by 35 U.S.C. § 112, paragraph 6. Claim 14 recites "a means for aligning the refractory body in the metal pouring vessel during at least a portion of the metal pour without substantially obstructing the flow of molten metal through the discharge nozzle, wherein the means for aligning is retained by the hollow chamber."

A sacrificial member is the structure clearly defined and linked to the means-plus-function limitation of claim 14 in compliance with 35 U.S.C. § 112, second paragraph. The specification, at p. 5, ll. 20-24, provides (emphasis added):

> The sacrificial elongated member may be constructed of hollow or solid metal and can be coated with a refractory material. If the elongated member is hollow, then the hollow can be filled with refractory material, as well. When the vortex inhibitor is placed in a molten metal receptacle, the sacrificial member can align the vortex inhibitor with the area in which the vortex would be likely to form.

The specification provides that the sacrificial member can align the refractory body with the area in which the vortex would be likely form, which is an example of an area within the metal pouring vessel as recited in the means-plus-function limitation of claim 14. The specification, at p. 5, ll. 25-27, provides (emphasis added):

> As the pouring process continues, the sacrificial member can dissolve into the molten metal bath, and thereby does not interfere with the flow of molten metal through the discharge nozzle.

This language in the specification is clearly linked to the claimed functionality of aligning the refractory body without substantially obstructing the flow of the molten metal through the discharge nozzle.

The figures depict examples of sacrificial member structures. Figures 2 and 3 depict sacrificial member 32. Figure 4 depicts sacrificial member 38. Figure 5 depicts sacrificial member 58. Figure 6 depicts sacrificial member 74. Figure 7 depicts sacrificial member 97.

Claim 30 is drawn to a vortex inhibitor for molten metal pouring from a discharge nozzle. (p. 4, ll. 2-4.) The vortex inhibitor includes a uniform castable refractory body having a generally tapering shape along a longitudinal axis from a base toward a narrow end and a hollow chamber positioned longitudinally to the body extending within the body. (p. 4, ll. 26-27.) The vortex inhibitor also includes a means for orienting the refractory body in a narrow end downward position without persisting in the discharge nozzle. The means for orienting is retained by the hollow chamber. (p. 8, ll. 17-18.) The integral body, *i.e.* the combination of the refractory body and the means for orienting, has a specific gravity less than

the specific gravity of molten metal, and is self-orienting in a narrow end downward position when supported in molten metal. (p. 4, ll. 8-9.)

Claim 30 includes a means-plus-function limitation as permitted by 35 U.S.C. § 112, paragraph 6. Claim 30 recites "a means for orienting the refractory body in a narrow end downward position without persisting in the discharge nozzle, wherein the means for orienting is retained by the hollow chamber."

A sacrificial member is the structure clearly defined and linked to the claimed means-plus-function limitation recited in claim 30, in compliance with 35 U.S.C. § 112, second paragraph. The specification at p. 9, ll. 21-31 provides (emphasis added):

> The sacrificial member 32 is preferably a metal pipe, rod or bar. The length and width of the sacrificial member can be varied greatly as long as the resulting vortex inhibitor construction has a specific gravity less than the specific gravity of the molten metal and is self-orienting in a narrow end downward position when supported in the molten metal. A refractory coating 34 is optionally attached to the surface of the sacrificial member 32. If the sacrificial member is hollow, a refractory coating or core 35 may be included within the hollow sacrificial member. Depending on the operating conditions of the molten metal receptacle, an interior or exterior refractory coating may prolong the life of the sacrificial rod 32. <u>The sacrificial nature of the elongated member does not impinge on the flow of molten metal through the discharge nozzle 14</u>.

The specification provides that the elongated member (sacrificial member) does not impinge on the flow of molten metal through the discharge nozzle 14, which is an example of orienting the refractory body in a narrow end downward position without persisting in the discharge nozzle, as recited in the means-plus-function limitation of claim 30.

The figures depict examples of sacrificial member structures. Figures 2 and 3 depict sacrificial member 32. Figure 4 depicts sacrificial member 38. Figure 5 depicts sacrificial member 58. Figure 6 depicts sacrificial member 74. Figure 7 depicts sacrificial member 97.

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-7, 9, 14-16, 24, 25 and 28-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,451,036 (*Eastwood*) in view of either U.S. Patent No. 4,494,734 (*Labate '734*) or U.S. Patent No. 4,709,903 (*Labate '903*).

Claims 1-12, 14-25 and 28-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Eastwood* in view of either *Labate '734* or *Labate '903.*

## VII. ARGUMENT

### A. Claims 1, 14, and 30 Are Patentable Under 35 U.S.C. § 103(a)

Claims 1, 14 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,451,036 (*Eastwood*) in view of either U.S. Patent No. 4,494,734 (*Labate* '734) or U.S. Patent No. 4,709,903 (*Labate* '903).

In the Office Action dated February 14, 2005, the Examiner responded, in part, to the Applicant's arguments filed on December 29, 2004, as follows:

> Applicant's argument that the member (12) of Eastwood does not either meet the means-plus-function limitation of a "means for orienting" and that the member (12) blocks the taphole are not persuasive. The member (12) of Eastwood is substantially identical in structure and form the "sacrificial member" of the instant claims and would reasonably be expected to operate in substantially the same manner, and would, absent any demonstrated new or unexpected result arising therefrom, meet the requirement of an orienting means as described in the instant claims, including not materially blocking the taphole, which function is performed by the body (2) of Eastwood. Further, since the vortex inhibitor itself is being instantly claims [sic], and not the combination of vortex inhibitor and taphole or metallurgical vessel, the use of the vortex inhibitor in any particular manner, including use in a vessel with a taphole configured so that the taphole is not blocked by the sacrificial member, is at best a suggested use of the claimed apparatus and therefore, not alone further limiting upon claims to the apparatus itself.
>
> Office Action, February 14, 2005, pp. 5-6.

The Examiner has acknowledged that Applicant has properly asserted means-plus-function terms in claims 1, 14 and 30. For instance, claim 1 recites "a means for orienting the refractory body in a narrow end downward position if the refractory body is misaligned". Claim 14 recites "a means for aligning the refractory body in the metal pouring vessel during at least a portion of the metal pour without substantially obstructing the flow of molten metal through the discharge nozzle." Claim 30 recites "a means for orienting the refractory body in a narrow end downward position without persisting in the discharge nozzle".

The Examiner has not applied the proper standard of examination to these claims containing means-plus-function limitations. According to M.P.E.P. § 2182 (emphasis added):

> [T]he application of a prior art reference to a means or step plus function limitation requires that the prior art element perform the identical function specified in the claim. However, if a prior art reference teaches identity of function to that specified in a claim, then under *Donaldson* an examiner carries the initial burden of proof for showing that the prior art structure or step is the same as or equivalent to the structure, material, or acts described in the specification which has been identified as corresponding to the claimed means or step plus function.

Instead, the Examiner summarily posits that "the member (12) of Eastwood . . . the requirement of an orienting means . . . function is performed by the body (2) of Eastwood." The Examiner has not and cannot show that the cited combination performs the identical function specified in the claims.

*Eastwood* does not teach, disclose or suggest the means of the claimed invention. *Eastwood* teaches an improved dart. *Eastwood* clearly states that a dart persists during the entire pour so that it can be present to act as a float member to close off the tap hole:

> Conventional darts consist basically of a head and an attached tail, the head being an enlarged body of refractory material and the tail being a relatively slender, elongate member, e.g. of 1 m length, with at least a portion of the tail extending below the head and being adapted to engage in the tap hole of the furnace,

> the head acting in effect as a float valve member and eventually closing off the tap hole as the level of the melt falls, to prevent slag exiting via the tap hole.
>
> (col. 1, lines 9-18.)

*Eastwood* does not teach, disclose or suggest the means of the claimed invention. *Eastwood* teaches a "tail extending below the head and being adapted to engage in the tap hole of the furnace." (col. 1, lines 13-14.) Eastwood further describes a "float valve member," wherein the head eventually "close[s] off the top." (col. 1, lines 15-16.) If the head "close[s] off the top," and the "tail extend[s] below the head," (col. 1, line 13) the tail first proceeds through the tap hole, and persists there during the pour. Hence, the function of the tail disclosed by *Eastwood* obstructs the discharge nozzle.

With respect to claim 1, *Eastwood* and the other art of record fail to teach, suggest, or disclose "a means for orienting the refractory body in a narrow end downward position if the refractory body is misaligned". Misalignment can refer to a situation where the refractory body is not in a narrow end downward position. Regarding *Eastwood*, an example of misalignment can be the tail not engaging the tap hole. In *Eastwood*, misalignment can occur if the refractory body and tail combination strikes the wall of the receptacle or otherwise does not engage in the tap hole of the furnace. For example, if the *Eastwood* device is introduced into the furnace prematurely, the tail may not engage the tap hole, resulting in misalignment. Disadvantageously, the body/tail combination of *Eastwood* may float on the surface of the molten metal due to misalignment. Since the *Eastwood* tail persists in the molten mental environment during the pour, the tail does not dissolve to allow the refractory body to orient in a narrow end downward position, which is the function recited in claim 1. For at least this reason, claim 1 is patentable in light of the *Eastwood* reference and other art of record.

With respect to claim 14, *Eastwood* and the other art of record do not teach, disclose or suggest "a means for aligning the refractory body in the metal pouring vessel during at least a portion of the metal pour without substantially obstructing the flow of molten

metal through the discharge nozzle". *Eastwood* teaches a tail constructed of materials known to be resistant to dissolution in molten metal. (col. 1, line 59; col. 2, lines 25-26.) For at least this reason, claim 14 is patentable in light of the *Eastwood* reference and other art of record.

With respect to claim 30, *Eastwood* and the other art of record do not teach, disclose or suggest "a means for orienting the refractory body in a narrow end downward position without persisting in the discharge nozzle". The *Eastwood* tail persists in the molten metal environment, to engage the tap hole during the pour. For at least this reason, claim 30 is patentable in light of the *Eastwood* reference and other art of record.

Furthermore, neither *Labate '734* nor *Labate '903* teach, disclose or suggest the means of the claimed invention. Both *Labate* patents teach a rod that persists in the tap hole as a guide the entire time it takes the body to get to the tap hole. *Labate '734* provides "rod and refractory sleeves forming guide means engageable in said tap hole for guiding said modified conical closure to engagement in said tap hole, said rod extending below said tap hole when said modified conical closure is engaged therein[.]" (col. 4, ll. 38-42). *Labate '903* provides "rod and refractory sleeves forming guide means engageable in said tap hole for guiding said barrel-shaped closure to engagement in said tap hole[.]" (col. 6, ll. 33-37). Further, Figure 6 of *Labate '903* illustrates that the tail penetrates through the tap hole when the body engages in the tap hole.

Therefore, Applicant respectfully requests the Patent Office to withdraw the rejections and allow the pending claims.

The fee of $250.00 as applicable under the provisions of 37 C.F.R. § 41.20(b)(2) was submitted in the Appeal Brief of September 6, 2005. Since the claims have not been amended since the payment of the fee in the prior Appeal Brief, please apply the fee

from the September Appeal Brief to this Appeal Brief. Please charge any additional fee or credit any overpayment in connection with this filing to our Deposit Account 02-3978.

Respectfully submitted,

**ROBERT J. KOFFRON, ET AL.**

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Enclosure - Appendices

## VIII. CLAIMS APPENDIX

1. A vortex inhibitor for molten metal pouring from a discharge nozzle comprising:

a uniform castable refractory body having a generally tapering shape along a longitudinal axis from a base toward a narrow end and a hollow chamber positioned longitudinally to the body extending within the body; and

a means for orienting the refractory body in a narrow end downward position if the refractory body is misaligned, wherein the means for orienting is retained by the hollow chamber;

whereby the integral body combining the refractory body and the means for orienting has a specific gravity of less than the specific gravity of molten metal.

2. The vortex inhibitor of claim 1 wherein the means for orienting is a sacrificial member.

3. The vortex inhibitor of claim 2 wherein crimps extending outwardly from the sacrificial member mount in the hollow chamber to form an integral body.

4. The vortex inhibitor of claim 2 wherein molten metal is disposed within the hollow chamber upon introduction into the metal receptacle.

5. The vortex inhibitor of claim 2 wherein the sacrificial member is hollow.

6. The vortex inhibitor of claim 2 wherein the sacrificial member is a solid bar.

7. The vortex inhibitor of claim 2 wherein an exposed surface of the sacrificial member is coated with a refractory material.

8. The vortex inhibitor of claim 7 wherein the sacrificial member has a refractory coating thickness less than about 9 millimeters.

9. The vortex inhibitor of claim 5 wherein the sacrificial member is filled with a refractory material.

10. The vortex inhibitor of claim 2 wherein the body includes a complex polygonal base.

11. The vortex inhibitor of claim 2 wherein the base is hexagonal.

12. The vortex inhibitor of claim 2 wherein the base is octagonal.

14. A vortex inhibitor for molten metal pouring from a discharge nozzle comprising:

a uniform castable refractory body having a generally tapering shape along a longitudinal axis from a base toward a narrow end and a hollow chamber positioned longitudinally to the body extending within the body; and

a means for aligning the refractory body in the metal pouring vessel during at least a portion of the metal pour without substantially obstructing the flow of molten metal through the discharge nozzle, wherein the means for aligning is retained by the hollow chamber;

whereby the integral body combining the refractory body and the means for aligning has a specific gravity less than the specific gravity of molten metal, and is self-orienting in a narrow end downward position when supported in molten metal.

15. The vortex inhibitor of claim 29 wherein the shaft is hollow.

16. The vortex inhibitor of claim 29 wherein the shaft is solid.

17. The vortex inhibitor of claim 15 wherein the sacrificial member contains external screw threads.

18. The vortex inhibitor of claim 16 wherein the sacrificial member contains external screw threads.

19. The vortex inhibitor of claim 17 wherein an end of the shaft contains internal screw threads, wherein the external screw threads on the sacrificial member and internal screw threads are mateable.

20. The vortex inhibitor of claim 15 wherein the sacrificial member contains internal screw threads and an end of the shaft contains internal screw threads.

21. The vortex inhibitor of claim 20 further comprising a nipple with external screw threads at each end, wherein the nipple mates the sacrificial member with the shaft.

22. The vortex inhibitor of claim 18 wherein an end of the shaft contains external screw threads.

23. The vortex inhibitor of claim 22 having a coupling containing internal screw threads, wherein the coupling mates the sacrificial member with the shaft, whereby the body and the sacrificial member combination form an integral vortex inhibitor.

24. The vortex inhibitor of claim 29 wherein the sacrificial member is hollow.

25. The vortex inhibitor of claim 24 wherein the sacrificial member is positioned snugly over the shaft.

28. The vortex inhibitor of claim 14 wherein the means for aligning is a sacrificial member.

29. The vortex inhibitor of claim 28 wherein the uniform castable refractory body includes a shaft is positioned within the hollow chamber.

30. A vortex inhibitor for molten metal pouring from a discharge nozzle comprising:

a uniform castable refractory body having a generally tapering shape along a longitudinal axis from a base toward a narrow end and a hollow chamber positioned longitudinally to the body extending within the body; and

a means for orienting the refractory body in a narrow end downward position without persisting in the discharge nozzle, wherein the means for orienting is retained by the hollow chamber;

whereby the integral body combining the refractory body and the means for orienting has a specific gravity less than the specific gravity of molten metal, and is self-orienting in a narrow end downward position when supported in molten metal.

31. The vortex inhibitor of claim 30 wherein the molten metal is steel.

## IX. EVIDENCE APPENDIX

**None**

## X. RELATED PROCEEDINGS APPENDIX

**None**